The joint effect of corporate risk disclosure and corporate governance on firm value

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Abstract

Purpose: We investigate the joint effect of corporate risk disclosure (CRD) and corporate governance (CG) on firm value in Tunisia.

Design/methodology/approach: We examine a sample of 156 firm-observations of Tunisian listed companies during 2008-2013. A manual content analysis method is used to measure the level of risk disclosure.

Findings: We find that CRD a negative and significant effect on firm value. In addition, family ownership negatively affects firm value. However, board size, the independence of the audit committee, and the presence of the women on the board lead to greater firm value. We find a substitution effect between CRD and CG mechanisms on the firm value.

Originality/value: This paper adds to risk disclosure studies by examining the economic consequences of CRD in emerging market. Furthermore, this paper contributes to the literature by being the first study, to the best of our knowledge, which investigates the joint effect of CRD and CG mechanisms on firm value.

Keywords: risk disclosure; corporate governance; firm value; content analysis; Tunisian firms.

1. Introduction

The overall business performance of Tunisia witnessed a decline in the recent years that was mainly because of the the Arab Spring. Indeed, the growth rate economy sharply decreased during 2019 (approximately one percent), contrary to the optimistic expectations at the end of 2018 (approximately three percent). These circumstances shed the light on implementing the necessary measures on the macroeconomic scale as well as the microeconomic one. Accordingly, on a microeconomic side, corporate disclosure (CD) practices, particularly corporate risk disclosure (CRD), and CG structure are believed to increase firm value. In point of fact CRD practice has gained considerable attention in current accounting literature. The importance of such practice has been emphasized after enormous collapses around the world, and relevant information is more required by the different shareholders in order to assess the risk'firm profile (Linsley and Shrives, 2005). Indeed, when the users of financial reports are aware about the companies'risks and the way that could be managed, they will be able to make an accurate assessment of the firm's risk profile and performance (Solomon *et al*, 2000). Furthermore, the effective CG mechanisms may enhance CRD. In addition, other trend of research showed that CG may has an impact on the firm value.

Prior studies have investigated the direct link between CG and firm value (e.g. Jaafar and El-Shawa, 2009; Erkens *et al*, 2012; Duppati *et al*, 2019). However, the results still inconclusive and differ within the context. Furthermore, although CRD has attracted a number of researchers to examine its determinants, research on the consequences of this type of disclosure is still limited and particularly scare in developing countries. Limited literature examined the impact of CRD on firm performance or firm value (e.g. Elshandidy *et al*, 2013, Bravo, 2017). Despite these efforts, no study, to the best of our knowledge, examined directly the joint effect of both the CRD and CG on firm value. The present paper aims to examine the effect of CRD and CG on the firm value. We use agency theory to develop our research hypotheses. Agency theory explains that the agency problem arises from information asymmetry between principals

(shareholders) and agent (management) (Jensen and Meckling, 1976; Fama and Jensen, 1983). Thus, to reduce agency problems and conflict of interest, disclosure and CG were considered part of the monitoring process allowing shareholders to assess managers' accountability, to make decisions and better forecasts. Consequently, risk disclosure may alleviate agency conflicts and is helpful to shareholders to have the accurate information about the firm risk profile and to build a trust relationship with managers (Linsmeier *et al*, 2002). Accordingly, CRD and CG are believed to have an impact on firm value. However, their joint effect on firm value should be investigated. Hence, this study seeks to add to the literature on CRD in emerging economies, using the Tunsian context, by investigating these potential relationships.

We contribute to the literature by examining the consequences of the CRD practices in an emerging context. Most of previous studies have examined CRD and firm value in developed contexts (e.g. Bravo, 2017) and few of them were interested in emerging context (e.g. Al-Maghzom *et al*, 2016). For that, there was call of more investigation on the economic consequences of risk information (Khlif and Hussainey, 2016, Haj-Salem *et al*, 2019). Moreover, the joint effect of CRD and CG has been neglected in accounting literature. To the best of our knowledge, our study is the first study that fill this gap.

Consequently, based on a sample of 156 firm-observations of Tunisian listed companies we investigate this association. Firstly, we examine the impact of CRD on firm value. Secondly, we complement prior research (e.g. Duppati *et al*, 2019), we examine the impact of CG in firm value. Finaly, we test whether there is a complementary or substitutive relation between CRD and CG on their impact on firm value.

The paper is structured as follows. Section 2 presents the literature review and the hypotheses development. Section 3 discusses the research method. Section 4 discusses the findings. Section 5 reports our robustness tests. Section 6 concludes.

2. Literature review and hypotheses development

2.1. Corporate Risk Disclosure (CRD) and firm value

Agency theory predicts a delegation of decision-making power on behalf from the principal for the benefit of the agent, which is likely to be conflicting, given the difference of interests between different parties. The proponents of agency theory (Jensen and Meckling, 1976; Eisenhardt, 1989) recognize that the agency problem is created due to the separation of ownership and control; which leads managers to focus on their self-interests, in contrast shareholders will be concerned by their own wealth. Further to the misalignment of interest, the agency problem appears when the principal lacks relevant information to accurately assess the the performance of the agent (Ross, 1973; Eisenhardt, 1989). These conflicts are the consequence of imperfect observability of the efforts of the agent by the principal. Therefore, to mitage information asymmetry and agency costs principals are believed to set up structural mechanisms (Eisenhardt, 1989). As a consequence, "to alleviate this loss, firm management voluntarily undertakes various actions, including disclosures and submission to monitoring" (Xiao *et al*, 2004, p. 197). Consequently, according to the agency theory the disclosure of information is an effective means to manage the interest' conflicts and alleviate monitoring managers by the investors and the creditors. Moreover, especially the agent can disclose whenever there is a risk and indicates the good ways to manage this risk. Hence, stakeholders will be better informed about the risk that may incur and will be able to assess the current and future firm performance. In fact, stakeholders, investors notably, as users of annual reports need company risk information before they make financial decisions. Therefore, CRD might positivley affect firm value. Furthermore, we rely on the signaling theory developed by Spence (1973) which could be used in any labour market characterized by information asymmetry in order to analyses people behaviors. Signalling theory predicts that, given the market imperfections related to the existence of asymmetric and insufficient information between the diverse participants to the market, the transmission of the information is made through the

disclosure of relevant information considered as signals. Indeed, these signals are intended to mitigate the information asymmetry. Disclosure used to be considered as a signal which reduces information asymmetry between insiders and outsiders (Akerlof, 1970). Many researchers used signaling theory to explain disclosure practice in general and CRD in particular (Al-Maghzom *et al*, 2016). Al-Maghzom *et al*, (2016) claimed that managers tend to signal their firm's performance by dissiminating more information in order to enhance firm reputation, stocks' liquidity of stocks and firm market valuation. In contrast, non-disclosure may lead to misinterpretation by stakeholders considering it as withholding the worst possible information (Spence, 1973) or the enability to differentiate between good and bad products which may give rise to markets meltdown (Strong and Walker, 1987). Therefore, we believe that, according to signaling theory, CRD via annual reports provides value relevant information to stakeholders for rationale investment decision and this would affect firm value (Merkley, 2014). When a company faced difficult circumstances or a disturbing environment, it will be of interest to provide risk related information to the market to signal risk-related information and how it can manage this risk.

Previous research disucussed the consequences of corporate disclosure in general. Some studies highlighted that voluntary disclosure enhances both the perception of future firm value to shareholders and the credibility of financial statements (Athanasakou and Hussainey, 2014). In addition, Ntim *et al* (2013) argued that corporate disclosure reduces the information asymmetry and allows the different shareholders to have access to critical resources. It plays an essential role for the capital market' functioning (Healy and Palepu, 2001).

In the same sense, and more recently, researchers investigated the consequences of CRD. They emphasized the importance of CRD to reduce information asymmetries between shareholders and managers (Dobler, 2008). Campbell *et al* (2014) demonstrated that CRD increases the market's assessment of a firm's risk and decrease the information asymmetry and are

incorporated into stock prices. In fact, stakeholders need risk related information for decision-making. CRD reduces information asymmetry and investors' uncertainty and consequently improve shareholders' confidence when evaluating companies. However, few are the studies examining the consequences of CRD. Moumen *et al* (2015) found that CRD improves investors' ability to predict future earnings for MENA countries. Furthermore, Bravo (2017) found that CRD enhances the investors' perceptions, which leads in turn to a better firm value. Indeed, companies may use CRD to send signal to stakeholders and reflect a good commitment with them by introducing the risk management tools to overcome the related risks. In the same sense, Elshandidy *et al* (2013) explained that managers disseminating risk information could differentiate themselves from others who did not disseminating this information and hence increase stakeholders' perceptions. When the company is faced to difficult circumstances or a disturbing environment it is in its interest to provide CRD to the market as a signal and provide a specific information this risk is managed.

According to agency (Eisenhardt, 1989; Jensen and Meckling, 1976) and signalling (Spence, 1973) theories and the above-mentioned literature (e.g. Elshandidy *et al*, 2013; Bravo, 2017), we set our first hypothesis as following:

H1 CRD has a positive impact on firm value.

2.2. Corporate governance (CG) and firm performance

According to agency theory, conflicts of interests can appear if managers and the shareholders, whose interests are supposed merged, divert part of the wealth of the firm on the detriment of creditors. This difference of interest associated with an information asymmetry gives rise to agency problems. For that, CG was considered as an effective tool to mitigate agency problems and to enhance investors'percpetions. In fact, CG is a set of mechanisms that aim to assure

financiers of getting a return on their investment, to prevent agency problems and to maximize shareholders' profits (Shleifer and Vishny, 1997). Mouselli and Hussainey (2014) argued that effective CG mechanisms help to monitor the opportunistic behavior of managers and hence reduce the agency problem that result from information asymmetry between managers and shareholders. In the same sens, Classens and Yurtoglu (2013) believed that CG mechanisms aim to help the firm to achieve its operational targets when there is a separation between management and firm's owenership.

In addition to its essential monitoring role, CG affects firm value (Wang *et al*, 2019). The consequences of CG have been subject of continous debate in prior research. The governance-performance relationship has been explained in the literature through agency theory. In fact, good CG mechanisms aim to regulate the opportunistic behaviour of managers and therfore to reduce the conflicts with shareholders (Fama and Jensen, 1983) with the primary purpose of improving the firm value (Aboud and Diab, 2018). Indeed, better is the CG, higher are the cash flows for investors and less are the corporate capital costs (Ammann *et al*, 2011).

The literature has reported mixed findings concerning the influence of CG on firm value. On one hand, some studies showed a positive impact (Brown and Caylor 2006; Ammann *et al*, 2011; Ammann *et al*, 2013; Siagian *et al*, 2013). In addition, researchers even showed that this relationship differ within the context. In Europe and emerging economies, the well-governed firms seem to have a better performance however; the findings are mixed (Bozec and Bozec, 2012; Core *et al*, 2008; Enache and Hussainey, 2019). On the other hand, some literature did not find a relationship between the two variables (Klein *et al*, 2005).

Researchers have examined the impact of a number of CG mechanisms on firm value. These include the board of directors characterstics, ownership structure and audit committee (e.g. Jaafar and El-Shawa, 2009; Hamdan *et al*, 2013; Ciftci *et al*, 2019). Accordingly, many

researchers examined the interrelation between firm performance and each CG attribute. For instance, prior empirical studies investigated the association between the board characterstics (board size, the independence of the directors, CEO duality, etc.) and firm performance. For instance, some of them (e.g. Bhagat and Black, 2002; El Mehdi, 2007) found a positive association between board size and firm performance explained by the various skills and expertise of the directors and their ability to oppose the CEO opportunism (Forbes and Milliken, 1999). However, others (Cheng, 2008; Liang *et al*, 2013; Bennouri *et al*, 2018) found that the smaller is the board the higher is the firm performance since this avoids coordination and communication problems and enhance the decision making (Jensen, 1993). Furthermore, board independence was considered as a monitoring mean on behalf of shareholders and tend to enhance firm value (e.g. Jaafar and El-Shawa, 2009; Joh and Jung, 2012; Duppati *et al*, 2019). In contrast, some studies provide a negative (e.g. Klein, 1998; Erkens *et al*, 2012) or insignificant association (e.g. Adams and Mehran, 2012) between board independence and firm value. There was also a debate on the association of firm performance and CEO duality. A review of prior empirical research shows contradicting findings. For instance, Gill and Mathur (2011), Pillai and Al-Malkawi (2018) found a negative relationship that could be explained by agency theory which predicts that duality increases self-beneficial actions and mismanagement (Donaldson and Davis, 1991). Other researchers (e.g. Bhagat and Bolton, 2002) found that the CEO duality may lead to better firm value. This was mainly explained through stewardship theory which predicts that duality of CEO and board chair positions empowers management to take autonomous executive actions (Davis *et al*, 1997). Nevertheless, no association between firm performance and CEO duality was found in other studies (e.g. Daily and Dalton, 1997).

Regarding ownership structure, prior empirical studies investigated the impact of concentration ownership, foreign ownership, managerial ownership family ownership on firm value. In this sense, we found mixed results. For instance, on one side, large shareholders increase firm value

due to their powerful monitoring role (Jaafar and El-Shawa, 2009). However, on the other side a negative association was shown (e.g. Demsetz and Lehn, 1985) or even a non-significant one (e.g. Omran *et al*, 2008). Moreover, according to agency and institutional theories (Jensen and Meckling, 1976; Shleifer and Vishny, 1986), institutional shareholders are considered to have specific values, regulatory systems and norms allowing them to have a greater pressure on managers' behaviors and the decision-making process and consequently a greater firm value (e.g. Erkens *et al*, 2012; Pillai and Al-Malkawi, 2018). Nevertheless, the empirical findings of Mashayekhi and Bazaz (2008) showed a negative association.

The impact of audit committee characterstics on firm value has been explored in the literature. The findings, however, were mixed. On the one hand, several researchers (e.g. Klein, 1998) found that the audit committee independence did not have a significant impact on firm value. Whilst, Hamdan *et al* (2013) demonstrated that audit committee independence as well as the financial expertise and the size of audit committee increase the firm value. Other line of literature use CG indexes (e.g. Core *et al*, 2006) or a composite CG measure (e.g. Enache *et al*, 2019) since different CG attributes may be complements or substitutes for one another (Chauhan *et al*, 2016). For instance, Enache and Hussainey (2019) relied on a principal component analysis applied to eight CG mechanisms and, according to the results, they consisdered the institutional ownership, the board independence, CEO duality, and board size as main variables for CG. The empirical findings revealed that governance mechanisms (independent directors) increase current and future firm value.

Based on prior studies and based on the agency theory as discussed above (Jensen and Meckling, 1976; Fama and Jensen 1983; Shleifer and Vishny, 1986, 1997), we expect that better governed firms have better firm value. Therefore, we propose our second hypothesis as follows:

H2 CG is positively associated with firm value

2.3. The joint effect of CRD and CG and firm value

Prior literature shows that both disclosure and governance contain value relevant information for stock market participants. For example, Wang and Hussainey (2013) found that better governed firms have better reporting practices that in turn improve the investors' ability to anticipate future earnings. In the same vein, Beekes *et al* (2016) showed that well-governed companies are more frequently transparent. Moreover, Katmon and Al Farooque (2017) demonstrated that both disclosure quality and internal CG mitigate information asymmetry. However, internal CG is less effective in reducing earnings managements rather than disclosure qualiy. They suggested that it might be more effective in mitigating other forms of agency cost. Recently, Alipour *et al* (2019) examined the moderating role of particularly the board independence in the association environmental disclosure quality and firm value. They found that independent board has a reinforcing effect on the positive impact of environmental disclosure on firm value. Furthermore, Enache and Hussainey (2019) found that US companies use disclosure and governance as substitutes mechanisms regarding only firms with products in advanced stages of development. They followed Hussainey and Walker (2003) approach which investigated whether there is a complementary or substitution effect of disclosure and dividends on share price anticipation of earnings.

Following Enache and Hussainey (2019), we identify four possible scenarios to test the joint effect of CRD and CG on firm value. First, we assume that CRD and CG are different ways of signalling the same information. This is because agency theory and empirical literature shows that both disclosure and governance are positively correlated (Wang and Hussainey, 2013). Therefore, we expect that the impact of each variable on firm value will be exactly the same as the impact of both variables on firm value. In other words, firms with high level of CRD but low CG quality will have roughly the same effect on firm value as firms with both high levels of CRD and CG quality. Therefore, we hypothesise that:

H3: The joint effect of CRD and CG on firm value is similar to the impact of each individual variable on firm value.

Secondly, we assume that CRD and CG provide unrelated information as risk disclosure literature shows that not all CG mechanisms affect CRD (Elshandidy *et al*, 2013). Therefore, we expect that CRD and CG may provide additive unrelated information and their joint impact on firm value will be insignificant. Therefore, we hypothesise that:

H4: The joint effect of CRD and CG on firm value is additive.

Thirdly, following Enache and Hussainey (2019), we presume that CRD and CG have a 'reinforcing' impact on firm value. Wang and Hussainey (2013) find that disclosure driven by high quality CG contains better value relevance compared with disclosure driven by low quality CG. This means that companies will have the strongest firm value when they have both high CRD levels and high levels of CG. Consequently, CRD and CG are strictly complementary. Therefore, we hypothesise that:

H5: The joint effect of CRD and CG on firm value is complementary.

Finally, based on the recent evidence by Enache and Hussainey (2019), the final scenario is that CRD and CG might have a 'substitution' effect on firm value. Indeed, when a firm has good CG this leads to reduced agency costs and information asymmetry. In this case, that firm might avoid the costs of CRD. Because of the expected substitution effect, the joint effect of CRD and CG is expected to be negatively related with firm value. Therefore, we hypothesise that:

H6 The joint effect of CRD and CG on firm value is substitutive.

3. Methodology

3.1. Sample and data

We analysed the CRD in annual reports of Tunisian listed companies for 2008-2013. We considered Tunisia a suitable context for our study. In fact, in the period of the study, Tunisia witnessed difficult economic and political circumstances that may affect severely the investors' perceptions. We consider that it is important, in such context, to understand the impact of CRD and CG on firm value. Furthermore, as many emerging markets, there is a gap in research on CRD and there are recently calls of papers to be undertaken in emerging markets (Khlif and Hussainey, 2016; Haj-Salem *et al*, 2019).

We chose the annual report because it is considered as a very important official means of disclosure (Marston, 2008) and as an influential source of information about a firm's performance for investors (Marston and Shrives, 1991). Our sample comprised all non-financial companies listed on the Tunisian Stock Exchange. We excluded financial firms because they may differ in terms of risk disclosure practices and how they are governed. Our original sample represents around 84 per cent of all non-financial companies listed in the Tunisian stock exchange in the period of study.

We apply some filtering rules regarding outliers to ensure the reliability of results. In fact, outliers may lead to inflated error rates and cause substantial estimation distortions (Zimmerman, 1995, 1998). Consequently, we remove outliers to avoid the influence of extreme observations. Deleting outliers is consistent with prior literature (e.g., Kothari and Zimmerman, 1995). Indeed, Zimmerman (1995) believes on the power of non parametric tests, the Student t test and the Wilcoxon-Mann-Whitney test, in detecting outliers. He states that "the criterion for identifying an outlier itself was based on a "mean" and "standard deviation" calculated from data in which the most deviant scores had been altered" (Zimmerman, 1995, p.73). Accordingly, to identify the existence of outliers we used the student t test for the residuals. Then we removed

any observation representing a t greater than 2 in absolute value following prior studies (e.g. Fox, 2016). Our final filtered sample has 156 firm-years observations. Table 1 summarizes the composition of our sample by economic sector.

[Insert Table 1 here]

Data collection was performed manually. Most of annual reports were collected from the CMF or directly from companies. Moreover, all the CG and firm value data is collected from annual reports, companies' web sites and the Stock Exchange of Tunis (BVMT) web site.

3.2. Dependent variable: firm value

For our study, we measure the firm value by Tobin's Q. Through the literature, various measures are used to assess the firm value. For instance, some researchers relied on the market-to-book ratio by dividing the market value of outstanding shares by the equity book value (Hassan *et al*, 2009 ; Bravo, 2017); others use as financial accounting performance measures the return on assets (ROA) and/or the return on equity (ROE) (Baron *et al*, 2009). Moreover, others combine different proxies for firm value such as ROE and Tobin's Q (Alqatan *et al*, 2019), Tobin's Q, ROE, and Earnings per share (EPS) (Wang *et al*, 2019), Market to book value ratio, ROA and Tobin's Q (Siagian *et al*, 2013).

Nonetheless, Tobin's Q is considrerd the most appropriate measure for firm value and it was commonly used particularly in the economic, accounting and finance literature (Fooladi *et al*, 2013; Utama and Utama, 2014; Wang *et al*,2019; Alqatan *et al*, 2019; Enache and Hussainey, 2019). Fooladi *et al* (2013) believe that Tobin's Q is the most suitable to measure the market performance rather than ROE and EPS that refect only accounting performance rather than long-term firm value. Following prior research (Setia-Atmaja *et al*, 2009; Enache and Hussainey, 2019), we define Tobin's Q as the ratio between the firm replacement value and the

firm's total assets. The replacement value is defined as the sum of the firm market value and total debts. Consequently, we calculate Tobin's Q as follows:

$$TBQ= (Market\ Value + Total\ Debts) / Total\ Assets$$

Following Enache and Hussainey (2019) we use the future Tobin's Q as proxy for firm value. Hence our model is the following:

$$Tobin's\ Q_{t+1} = \alpha_0 + \beta_1 CRD_t + \beta_2 governance_t + \beta_3 CRD*governance_t + \beta_4 Size\_ac + \beta_5 Size\_comp_t + \beta_7 Lev_t + \beta_8 Liquid_t + \beta_9 Divd_t + \varepsilon$$

3.2.1. Corporate risk disclosure (CRD)

We used the content analysis approach to assess the level of CRD in Tunisian annual reports. The principle of content analysis as defined by Kothari *et al* (2009, p. 1649) is that "the many words of a text can be classified into many fewer content categories, where each category consists of one or many similar words or word phrases, and that each word or phrase occurrence can be counted and the counts compared analytically".

In order to measure the level of CRD in Tunisian annual reports we used a manual content analysis. In fact, despite the advantages of the automated content analysis we believe that the manual content analysis is more suitable for our study owing to its advantages.

Hence, we chose a manual content analysis for a number of reasons. First, we believe that the meaning of word within a context are better judged by humans rather then softwares (Deumes, 2008). This was in line with Abraham and Stevenson (2007) who used a manual method and argued that this enables them to extract the suitable themes from annual reports, as any user of annual reports will do. However, this approach was criticized in the literature and particularly regarding its subjectivety (Linsley and Shrives, 2006), humans errors (Krippendorff, 2004), and the the inability to analyse a hudge sample size due to the generated costs, time consuming and

higher probability of human error (Nacos *et al*, 1991; Shevlin, 2004). Hence, to overcome to these limitations it was necessary to adopt a validation procedure that consists in having more than one person who read and code the written document to increase the confidence that the interpretation of written documents show the objective reality (Bowman, 1984).

However, we have to note that whatever is manual or automated approach, the use of the content analysis, requires the researcher to design a coding scheme involving a number of stages, which aim to determine the following: the research question, the codable document, the coding unit, the disclosure categories and the coding mode. Then, the researcher needs to assess the reliability of coding before the results and interpretation (Rajab and Schachler, 2009).

Hence, according to this we set up the following:

- The research question

Is there any information about a risk trough the document?

- The codable document

All the content of the annual reports of the sample

- The coding unit

The sentence

- Disclosure categories

We use an index adopted from Linsley and Shrives (2006) and Moumen *et al* (2015), and adjusted to our Tunisian context by adding items obtained after reading annual reports. The final risk disclosure index is composed of 48 items (Appendix A)

- The coding mode

In our study, we use an un-weighted approach to measure the level of CRD in Tunisian annual reports. Hence, we assign a value of 1 if a sentence is related to risk information and zero otherwise.

The measure of the level of CRD was performed according to decision rules that were adopted from Linsley and Shrives (2006, p. 402), Konishi and Mohobbot (2007, p. 283) and Moumen *et al* (2015, p.13) with some modifications. These decision rules aim to give the reader more clarification of the content analysis process in order to enhance the reliability and to minimize differences of the results.

Hence, the decision rules for CRD of our study are the following:

-Any information that explicitly indicates a risk should be retained. Otherwise, the implied risk information should be disregarded

-We code sentences as a risk disclosure if the reader is informed of "any opportunity or prospect, or of any hazard, danger, harm, threat or exposure, that has already impacted upon the company or may impact upon the company in the future or of the management of any such opportunity, prospect, hazard, harm, threat or exposure".

-The classification of risk disclosures shall be made by reference to the Appendix A

-If a sentence has more than one possible classification, the information will be classified into the category that is most emphasized within the sentence.

-Any disclosure that is repeated is considered as a risk disclosure for one time

- The reliability of the results

Three types of reliability have been assessed within content analysis: stability, reproducibility and accuracy according to Krippendorff (1980). Firstly, stability "measures the degree to which a method of analysis yields identical results when applied to the same data at different points in time" Krippendorff (1980, p. 72). Differences in results can be due to human errors related to fatigue, personal bias, and perception (Downe-Wamboldt, 1992). For our study, the stability was justisfied since we do not found significant differences by recoding five annual reports later. However, stability is considered insufficient to confirm the reliability of the content analysis due to the fact that only one researcher codes the text. That is why many researchers

have used one or more independent coders (Abraham and Cox, 2007; Lajili and Zeghal, 2005; Linsley and Shrives, 2006; Rajab and Schachler, 2009) responding to the second form of reliability which is reproducibility also known as inter-reliability. Reproducibility was used by many researchers to test the reliability of their analysis and argued that the index scores could be considered reliable if other researchers could replicate the same results (Al-Maghzom *et al*, 2016; Haj-Salem *et al*, 2019). Consequently, two other independent researchers have read separately five annual reports by using the risk disclosure index. Following Haj-Salem *et al* (2019) we compared the results by calculating the Scott's Pi test through the "ReCal" online statistical software. The findings show that the average of Scott pi reliability test score for the first coder was 0.8604. Regarding the second coder, the Scott's pi reliability test average score was 0.8692. A result of 0.75 is often considered a satisfactory level of inter-rater reliability (Hackston and Milne, 1996; Linsley and Shrives, 2006; Abraham and Cox, 2007). Consequently, our risk disclosure measure is considered sufficiently reliable since a Scott piof 0.75 is often considered a satisfactory level (Abraham and Cox, 2007; Haj-Salem *et al*, 2019)

Finally, the accuracy is fulfilled since the risk disclosure level was established following Linsley and Shrives (2006) and Moumen *et al* (2015) with some modifications according to the Tunisian context.

3.2.2. Corporate governance (CG)

For our study, we considered twelve CG mechanisms. Four mechanisms are related to the ownership structure that are the concentration ownership, family ownership, foreign investors, managerial ownership, institutional ownership and government ownership. Five are related to the board composition that are the independence of the board, CEO Duality, board size, presence of women on the board. Also, two mechanisms regarding the audit committee that are the expertise of the audit committee members and the audit committee size. We followed

Enache and Hussainey (2019) to construct a CG index. Hence, an exploratory principal component analysis (PCA) was conducted inorder to identify the main corporate governance mechanisms. Consequently, the factors with an eigen value greater than the unity were retained. Hence, we considered five component (Comp1, Comp2, comp3, comp4 and Comp5) that represent almost 68.94% of the total variance in the original data.

3.2.3. Control variables

We considered several control variables such as firm size, leverage, liquidity and dividend. According to the practitioners of the agency theory, the large-sized companies undergo a higher agency costs. Indeed, the more a company is important, the more the potential investors require detailed information to make investment decisions (Inchausti, 1997). Consequently, this agency cost could be reduced by the disclosure of risk related information. The firm size is measured by the natural logarithm of the total assets.

We included also the leverage as control variable and measured it by the ratio of total liabilities divided by total assets of the firm. According to the agency theory, agency costs are raiser in highly leveraged firms (Fama and Miller, 1972; Jensen and Meckling, 1976; Smith and Warner, 1979). Indeed, the long-term creditors require having more financial information than the shareholders (Wallace *et al,* 1994). To say it differently, to reduce monitoring costs, companies with high levels of debt are compelled in addition to be aimed at shareholders to provide more information to satisfy the specific needs of long-term creditors.

Regarding the liquidity, it was measured by the ratio of the current assets divided by the current liabilities. In risk disclosure literature, Marshall and Weetman (2007) and Elshandidy *et al* (2013) found that high-liquidity firms provide more risk information to send positive signals to investors. In addition, Elzahar and Hussainey (2012, p. 6) state that "according to signaling theory, companies' managers will disclose more information if their liquidity ratios are high, to

distinguish their skills in managing liquidity risks comparing with other managers in companies with lower liquidity ratios".

The dividend-yield is measured by the ratio of the most recent full-year dividends divided by the current share price. According to signaling theory, firms with high dividend yield are more motivated to disclose risk information in order to signal the companies' threats and their ability to manage them. Elshandidy *et al* (2013) argued that firms with greater risk disclosure might be more susceptible to distribute a greater dividend yield to compensate the shareholders for these risks. Some prior studies found that the information asymmetry is lower in firms characterized by a higher level of dividend (Deshmukh, 2003; Khang and King, 2006; Li and Zhao, 2008). In addition, Hussainey and Al-Najjar (2011) revealed that dividends and corporate narrative reporting are positively correlated. Moreover, Wang and Hussainey (2013) found a positive relationship between forward looking information and dividend yield. In addition, Linsley and Shrives (2006), Abraham and Cox (2007) found a positive association between aggregated and voluntary risk disclosures and dividend yield. We summarized all our variables in the table 2.

[Insert Table 2 here]

4. Results

4.1. Descriptive statistics

Table 3 provides the descriptive statistics for continuous variables. It shows that the mean value of Tobin's q is 1.68 with a minimum value of 0.43 and maximum value of 4.7494. It also reports that the CRD is for a mean of 5.17 reflecting a low level of risk disclosure for Tunisian listed companies. Regarding the ownership structure, we note that the firms are highly concentrated with a mean of 69.14 %. Futhermore, they are charecterized by a family ownership with a mean of 34.18 % and a maximum value of 88.81%. In addition, the managerial ownership varies from

a minimum value of 0 % and a maximum value of 73.5%, similarly the governmental ownership differs significantly among companies with a mean of 14.27 %, minimum value of 24.57% and maximum value of 79.81%.

With regard to the board, it is composed on average with 8 directors. The independent directors are absent in some firms and are present in others with a mean of 19.76% and at mot 66.66%. The presence of family members in the board varies form a mimum value of 0% and a maximum value of 71.42%. This could be related to the ownership structure revealed earlier. However, we note a weak presence of women on boards with a mean of 8.40% and a maximum of 37.5%. Regarding CEO duality as presented in table 4, the majority of Tunisian firms (76.28%) are characterized by a CEO duality.

Table 3 shows also that audit committee size has a mean of 3.01 which means that it is composed mostly with three numbers and maximally with four members. However, we can notice an infraction by a minimum of 0 members. In fact, the listed Tunisian companies have the obligation to have an audit committee. In addition, the independence of the audit committee members is low with a mean value of 14.70% and a maximum of 33.33%.

[Insert Tables 3 & 4 here]

In order to check the multicolinearity problem the correlation matrix and the variance inflation factor (VIF) are performed as reported respectively on tables 5 and 6. Discernibly, the correlations among variables are averagely low. Furthermore, the VIF test indicates that no value is greater than 10, which confirm the non-multicollinearity.

[Insert Tables 5 & 6 here]

4.2. Multivariate analysis

The multivariate analysis will follow mainly two steps the principal component analysis (PCA) and the panel data in order to test empirically the hypotheses. The first step (PCA) allows us to construct the corporate governance measure by reducing the number of governance attributes. The second one aims to study the relationship between CRD and firm value, corporate governance and firm value, and the joint effect of CRD and CG on the firm value.

For this purpose, we focus, first of all, on the PCA analysis across corporate governance attributes. The advantage of using this method is is to extract the most important information from the data (Larker *et al*, 2007) and accordingly to reduce the number of CG attributes by identifying the main CG mechanisms. This method was used in several studies (e.g. Larcker *et al*, 2007; Enache and Hussainey, 2019)

Hence, a principal component analysis (table 7) is performed to the following CG mechanisms: concentration ownership, managerial ownership, institutional ownership, government ownership, family ownership, independence of the board, CEO duality, board size, presence of women on the board, presence of family members on the board, independence of the audit committee and the audit committee size. We retain five components having an eigenvalue greater than the unity and that allow an explanation of almost 68.94% of the total variance in the original data.

[Insert Table 7 here]

In order to enhance the interpretability of the resulsts an oblique rotation of the retained five components is performed as presented in table 8. Consequently, we use the following variables as main variables of corporate governance: family ownership (component 1), board size (component 2), independent audit committee (component 3), institutional ownership (component 4) and the presence of women on the board (component 5).

[Insert Table 8 here]

After having performed the PCA to CG attributes, the next step was carried out through a panel data analysis. Accordingly, we started by running a specification panel test (the pooling test) following Beck (2001) to decide of the homogeneity or heterogeneity of the panel data. We found that the Chow test returns an F (31, 109) = 29.11 and a prob>F = 0.000. Hence, we should reject the null hypothesis of homogeneity among individuals. This led us to conclude the sample heterogeneity, and then to test the existence or not of individual effect. Therefore, on the one hand, we run a fixed effects model (Within estimate) and on the other hand, we run the random effect (estimation with generalized least squares, GLS). We compare between the two methods by the Hausman test to determine the most suitable model. We found that Prob>chi2 = 0.4364, consequently we retain the random effects model. Hence, our main empirical findings are based on random effect model for the sample period 2008-2013.

Furthermore, it was crutial to check the homoscedasticity. Indeed, if the heteroscedasticity is not corrected the estimated variances and covariances are biased and inconsistent (Kmenta, 1986). Consequently, this could be done through the Lagrange Multiplier (LM) Test. According to the chi2 statistics displayed through this test, the null hypothesis of homoscedasticity is rejected for the two models, due to the significant chi2 statistic (Prob>chi2 = 0.000). Hence, there is a heteroscedasticity problem that has been corrected following the method of White (1980) in order to have unbiased results.

Considering that serial correlation biases the standard errors and causes a less efficiency of the results, we checked the autocorrelation between residuals. Many tests for serial correlation have been developed, however the Wooldridge (2002) test is considered easier to implement and requiring few assumptions. Since it is based on "fewer assumptions, it should be less powerful than the more highly parameterized tests, but it should be more robust" (Drukker, 2003; p. 168).

Consequently, the findings of the Wooldridge (2002) test in panel data (Prob > F = 0.0002) leads us to reject the null hypothesis and to conclude that the residuals are auto correlated.

Table 8 reports these findings. The results show a negative and significant association between CRD and firm value measured by Tobin's Q. Hence, the CRD leads to less firm value. Therfore, the first hypothesis is rejected since we predicted a positive association. This negative and significant association indicate that CRD is not relevant for investors's perceptions, this may be related to the low level of disclosure. Indeed, a negative association between disclosure and firm value was explained by Hassan *et al* (2009) that is due to the corporate culture of Egyptian market who is known by secrecy rather than transparency. Hence, a high voluntary disclosure level could represent an adverse signal to investors. In this sense, the disclosure could be misinterpreted and generate suspects and uncertainty about the future of the company, thus a lower firm value. Likewise, the Tunisian market is known by a low level of disclosure, hence an unusual disclosure of risk information may be also considered as an adverse signal. Our findings are supported by Wang *et al* (2013) who showed that voluntary disclosure, during moment of crisis, increased, while firm value decreased. Moreover, Fatemi *et al* (2017) found that companies with environmental, social, and governance strengths, its disclosure is negatively associated to firm value and that it depends to the nature of their informational content. That leads us to conclude that CRD negatively affects firm value.

Regarding the relationship between CG (Compo1, Compo2, Compo3, Compo4 and Compo5) and firm value, the table 9 reports different results. The coefficient of component 1 on Tobin's Q is negative and significant at the level of 5 percent. However, the coefficients of components 2, 3 and 5 are positive and significant on firm value at 5 and 1 percent. While component 4 did not have a significant impact on firm value.

As component 1 is represented by family ownership, we conclude that the less is the firm family ownership the better is the firm value. These findings are inconsistent with some researchers who support that family ownership mitigates the agency problem between managers and shareholders, and they found a better performance for family firms in the US than comparable to nonfamily ones (Villalonga and Amit, 2006). Nevertheless, our results are on line with Holderness and Sheehan (1988) who found a lower performance for family majority-controlled firms. This might be explained by agency theory. In fact, agency Problem II appears rather then agency problem I when the majority of shares are hold by an individual or a family in the sens that they will have an opportunistic behaviour instead of the other shareholders and thus leads to poor performance of these firms. In addition, Anderson and Reeb (2003) demonstrated that the positive association between family ownership and firm value starts to mitigate off at around 30 percent ownership.

The component2 is represented by board size. According to the results, we conclude that board size has a positive effect on firm value. The findings are in accordance with Bhagat and Black (2002), and El Mehdi (2007), while they are inconsistent with Liang *et al* (2013), and Bennouri *et al* (2018). The positive association could be explained by the greater efficiency of larger board due to the diffrent skills and expertise of the directors to monitor the CEO opportunism. Besides, the component3 (independence of the audit committee) has a positive and significant impact on the firm value. The findings are in line with Hamdan *et al* (2013). The positive associaiton could be explained from an agency perspective. Indeed, independent members are considered crucial to monitor mangement and reduce conflicts of interest (Fama & Jensen 1983). They are not allied with the management and will act in the best interest of shareholders, thus increase firm value. With regard to component5 (the presence of women on the board), the findings show a positive and significant effect on firm value. The results are consistent with Isidro and Sobral (2015) who attest that women have an important role by bringing various

ressources and making the board more efficient which leads to greater firm value. Accordingly, we confirm that the presence of women on the board improves firm value due to distinctive monitoring role. Moreover, their presence improves the compentence board profile, a diversity of backgrounds and life experience (Alvarez and McCaffery, 2000). Those ideas are supported by human resource theory, which suggest that board diversity enhance firm value (Cox, 1993).

The coefficient of the interaction term of both Crd_compo1 and Crd_compo4 are positive and non-significant. Nevertheless, the total of CRD, COMPO1 and CRD*COMPO1 (-0.1905086) is greater than total CRD and COMPO1 (-0.1955007). In addition, the total of CRD, COMPO4 and CRD*COMPO4 (0.0682684) is greater than total CRD and COMPO4 (0.0609488). Consequently, the findings indicate that the combination of family ownership and risk disclosure produces related information that are "reinforcing". This is the same for the institutional ownership. Hence, firm value will be the highest for firms characterized by family ownership and high level of risk disclosure. Furthermore, firms with institutional ownership and better risk disclosure lead to the highest firm value.

Besides, the coefficient of the interaction term (Crd_compo2) is negative and significant. Furthermore, if we compare the total of CRD, Compo2 and CRD*Compo2 (0.1042995) to the total of only CRD and Compo2 (0.1303998) we found that the former is less than the latter. Hence, the findings suggest a substitutive effect between the risk disclosure and corporate governance on the firm value. For that, the board size may act as a corporate governance mechanism by itself without being coupled with high level of risk disclosure. Accordingly, when considered together, the risk disclosure and corporate governance have a substitutive effect on firm value. That means the risk disclosure with presence of good governance lead to lower firm value.

However, the coefficient of the interaction term CRD*compo3 and CRD*compo5 is negative and non-significant. Furthermore, if we compare the total of CRD, Compo3 and CRD*Compo3 (0.341214) to the total of only CRD and Compo3 (0.355232) we found that the former is less than the latter. Similarly, for the total CRD, COMPO5 and CRD*COMPO5 (0.3443057) is less than total CRD and COMPO5 (0.3738286). Hence, there is a substitution effect between the audit committee independence and CRD on firm value. In addition, the presence of women on the board and risk disclosure have also a substitution effect on firm value. In that case, when the audit committee independence is higher, instead of better risk disclosure, this might have greater impact on firm value, and the two mechanisms would have a substitutive effect. Similarly, we confirm that the marginal benefits of CRD decrease in the presence women on the board. Hence, the impact of CG, particularly the audit committee independence and the presence of women on the board, and risk disclosure in improving firm value is mitigating in the presence of each other. These findings are consistent with Enache and Hussainey (2019) who found that there is a substitutive effect of disclosure and CG on the current and future performance of biotech companies.

[Insert Table 9 here]

4.3. Robustness check

In order to confirm the validity of the findings we performed a robustness check. This consists to run our model differently by using log transformation for the dependent variable. This method was used by researchers to avoid potential cases of non-normal distribution, non-linearity between dependent and independent variables, heteroscedasticity, etc. (Cooke, 1998). The homogeneity panel test indicated heterogeneity among individuals. This led us to run the Hausman test which in turn show a a Chi2 greater than five percent (Prob>chi2 = 0.0727), consequently we retain the random effects model. Likewise, before runing the random effect

model we corrected the heoscedasticity and the autocorrelation, since respectively, the Chi2 statistics displayed through LM test (Prob > chi2 = 0.000) and the Wooldridge test (Prob > F = 0.0001) were significant. Accordingly, the comparison of our findings with those after log transformation, lets us to note approximatively the same results. Hence, we can confirm the robustness and validity of our findings. Table 10 reports the findings of the random effect regression and those of the regression after log transformation.

[Insert Table 10 here]

5. Conclusion

CRD has gained considerable attention giving rise to a multitude researches. Whereas more recent accounting studies have been devoted to examine the practices of risk disclosure, mainly its determinants and few other studies explored its relevance, researchers have to considerate some neglegted questions. This paper addresses mainly the question of whether CRD and CG have a complementary or substitutive effect on firm value.

The empirical findings are based on a sample of 156 firm-observations listed on the Tunisian Stock Exchange during 2008–2013. A manual content analysis method is performed to measure the level of risk disclosure. We generate our estimation from a random effect model whereby we control with firm size, leverage, liquidity and dividend.

Our empirical findings show that CRD has a negative and significant effect on firm value. Hence, the CRD leads to lower firm value. We also find that family ownership negatively affects firm value. However, board size, the independence of the audit committee, and the presence of the women on the board lead to greater firm value. Furthermore, the findings suggest a substitutive effect between CRD and CG on the firm value. That means CRD with presence of good CG lead to lower firm value.

We contribute to risk disclosure literature by studying the impact of this type of disclosure on firm value in Tunisian context. In fact, studies examining economic consequences of risk disclosure remain scare particularly in emerging markets. Furthermore, this paper contributes to the literature by being the first study, to the best of our knowledge, that investigates the joint effect of CRD and CG on firm value.

The findings of our study have several implications both theoretical and practical ones. Theoretically, the findings of this research add to risk disclosure literature particularly in emerging markets. In addition, in order to assess the level of CRD we adapted an index to the Tunisian context. Secondly, it extends the risk disclosure and economic consequence literature by analyzing theoretically and empirically this association. Thirdly, it explored the nature of the association between CRD and CG on firm value.

Moreover, this paper offers practical implications. In fact, the examination of CRD in the Tunisian listed companies could be helpful to the different stakeholders. Furthermore, due to the moderate level of risk disclosure we suggest Tunisian regulation bodies to impose regulations about the corporate risk disclosure. Consequently, this may lead the risk disclosure to be usefull for stakeholders. Moreover, since we found that CG mechanisms are substitutive with CRD it would be interesting to to arbitrate between costs and benefits and substitute one for the other.

Nevertheless, the current study has its own limitations. The major limitation of this study is the relatively small sample. However, the small sample is due to the unavailability of the majority of annual reports and the data for some variables that were collected manually. In addition, this is the major limitation of studies who deals with manual content analysis due to the time and efforts consuming. However, our sample represent the most of non-financial listed companies in the Tunisian Stock exchange. Moreover, other limitation is inherent to manual content analysis, which is the subjectivity of the results. However, in order to ensure the reliability and

validity of our scores we followed Krippendorff (1980) and tested the stability, reproducibility and accuracy of the findings of the content analysis.

Finally, further researches could be conducted to investigate the joint effect of listed companies by distinguishing between high- and low-growth firms, since, some disclosure studies (Hussainey and Walker, 2009) and particularly some risk disclosure ones (Haj-Salem *et al*, 2019) suggest that firms with high growth are more likely to enhance their risk disclosure. Moreover, further research could investigate the joint effect of CRD quality (rather than CSR quantity) and CG on firm value.

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Table 1: Sample description

Sectors	Number of firms
Telecommunications	2
Consumer services	
-General retailers	4
-Travel and leisure	1
Health	2
Consumer goods	
-Automobiles and parts	5
-Food and Beverage	4
-Personal and household goods	1
Industrials	
-Construction and materials	6
-Industrialgoods and services	2
Basic Material	
-Chemicals	3
-Rawmaterials	1
Oil and Gas	1
TOTAL	32
Original sample	192
(-) Missing reports	29
(-) Outliers	7
Final sample	156

This table describes the sample selection

Table 2 variables' description

Variable name	Variable description	Measure
TBQ	Tobin's Q	(Market Value + Total Debts) / Total Assets
CRD	Risk disclosure	Risk disclosure index as decriped in Appendix A

Conc	The concentration ownership	The proportion of shares owned by major shareholders (who hold at least 5% of equity ownership within the firm)
Mo	Managerial ownership	The proportion of shares owned by institutional investors
Inst	The Institutional investors	The proportion of equity held by managers and executive directors
Gov	Government ownership	Proportion of shares owned by government agencies
Famo	Family ownership	Proportion of common shares held by the founding family and their relatives
Outsdr	The board independence	The proportion of independent non-executive directors relative to the Board size
Dual	The CEO Duality	« 1 » if there is a duality, « 0 » otherwise
Size_bd	The board size	The number of directors sitting on the board at the end of each year
Women	The presence of women on the board	The proportion of women on the board size
Famd	The presence of family members on the board	The proportion of family members on the board
Size_ac	Audit Committee Size	Number of committee members.
Ind_ac	Audit Committee Independence	The proportion of independent Committee members.
Size_comp	Size of the company	Natural logarithm of total assets at the end of the year
Lev	Liquidity	liquidity ratio = Current assets/current liabilities
Liquid	Leverage	Total liabilities/ total assets of the firm
Divd	Dividend-yield	The ratio of the most recent full-year dividends divided by the current share price

This table presents defenitions of the variables used in this study

Table 3. Descriptive statistics for continuous variables

Variable	Obs	Mean	Std. Dev.	Min	Max
TBQ	156	1.684436	.8370441	.4385	4.7494
crd	156	5.179487	3.171419	0	13
conc	156	.6914654	.1382707	.401	.9678
mo	156	.1555679	.1913094	0	.735
inst	156	.1525115	.1543858	0	.5439
gov	156	.1427827	.2457763	0	.7981
famo	156	.3418	.316486	0	.8881
outsdr	156	.2948962	.1976954	0	.6666
size_bd	156	8.724359	2.090142	5	12
women	156	.0495308	.0840356	0	.375
famd	156	.2290949	.2490075	0	.7142
size_ac	156	3.012821	.5790669	0	4
ind_ac	156	.0982827	.1470881	0	.3333
size_comp	156	7.987269	.4806937	7.0494	9.2242
lev	156	56.1678	34.06071	9.3359	214.9384
liquid	156	1.995576	1.448277	.324	7.4998
divd	156	.0256506	.0255928	0	.1286

This table describes the univariate statistics of the continuous variables used in this study. All variables are defined in Table2.

Table 4. Descriptive statistics for dummy variable

Dual	Obs	Proportion	Std. Err.
0	156	.2371795	.0341652
1	156	.7628205	.0341652

This table describes the univariate statistics of the dummy variable used in this study. The variable is defined in Table2.

Table 5. Correlation matrix

	TBQ	crd	compo 1	compo 2	compo 3	compo 4	compo 5	crd_compo1	crd_compo2	crd_compo3	crd_compo4	crd_compo5	Size_comp	lev	liquid	divid
TBQ	1.0000															
crd	-0.1968	1.0000														
compo1	-0.2875	0.2412	1.0000													
compo2	0.0540	0.2260	0.0000	1.0000												
compo3	0.2965	-0.0142	-0.0000	0.0000	1.0000											
compo4	0.1801	0.1233	0.0000	0.0000	-0.0000	1.0000										
compo5	0.2004	0.1841	-0.0000	0.0000	-0.0000	-0.0000	1.0000									
crd_compo1	-0.2621	0.3353	0.8706	0.0289	-0.0820	0.0748	0.1031	1.0000								
crd_compo2	-0.1259	0.2454	0.0314	0.8173	-0.1862	-0.1791	0.0042	0.0699	1.0000							
crd_compo3	0.2576	0.0238	-0.0814	-0.1701	0.8662	0.0968	0.0357	-0.1433	-0.3458	1.0000						
crd_compo4	0.1708	0.0873	0.0701	-0.1545	0.0914	0.8716	0.0895	0.1281	-0.3278	0.2164	1.0000					
crd_compo5	0.1103	0.2273	0.0998	0.0037	0.0348	0.0924	0.8789	0.1838	-0.0213	0.0696	0.1784	1.0000				
size_comp	0.0112	0.1410	0.1397	0.3022	0.1969	-0.0262	0.2286	0.1580	0.2397	0.1108	-0.0373	0.1718	1.0000			
lev	0.0647	0.2272	0.0030	-0.1722	0.4333	0.2915	0.2487	0.1155	-0.3566	0.5137	0.4289	0.3957	0.2458	1.0000		
liquid	0.0540	-0.2028	0.0625	-0.0151	-0.4244	0.1255	-0.2319	-0.0103	0.0480	-0.3823	0.0412	-0.1951	-0.4392	-0.5376	1.0000	
divid	-0.0346	-0.1680	-0.0122	0.1685	-0.0222	-0.0104	-0.1057	-0.1210	0.2208	-0.0793	-0.0189	-0.1243	-0.0551	-0.3875	0.3019	1.0000

This table presents the correlations among the variables. All variables are defined in Table 2. ***, **, and * indicate statistical significance at 1, 5, and 10 % levels of statistical significance for two-tailed tests

Table 6. VIF

Variable	VIF	1/VIF
crd_compo5	6.32	0.158145
crd_compo4	5.92	0.168942
compo5	5.88	0.170084
crd_compo3	5.46	0.183289
crd_compo1	5.37	0.186161
compo1	5.31	0.188492
compo4	5.21	0.192084
compo3	5.18	0.193008
crd_compo2	4.41	0.226681
compo2	3.70	0.270450
lev	3.61	0.276975
Liquid	2.16	0.462308
size_comp	1.59	0.629184
crd	1.47	0.681642
divd	1.39	0.721784
Mean VIF	4.20	

This table examines the Variance Inflation Factor

Table 7. Explained variance by components

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.70551	.6167	0.2255	0.2255
Comp2	2.08881	.8324	0.1741	0.3995

Comp3	1.25641	.0879442	0.1047	0.5042
Comp4	1.16847	.115404	0.0974	0.6016
Comp5	1.05306	.138548	0.0878	0.6894
Comp6	.914516	.173675	0.0762	0.7656
Comp7	.74084	.105349	0.0617	0.8273
Comp8	.635492	.111314	0.0530	0.8803
Comp9	.524178	.140131	0.0437	0.9239
Comp10	.384047	.0781223	0.0320	0.9559
Comp11	.305924	.0831831	0.0255	0.9814
Comp12	.222741	.	0.0186	1.0000

This table presents the principal component analysis to the twelve corporate governance mechanisms used in this study.

Table 8. Rotated components

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
conc	0.4514	0.2842	-0.1470	-0.0415	0.4557	.2771
mo	0.1619	-0.4490	0.1519	0.0276	0.4436	.3748
inst	-0.1900	-0.0486	-0.0180	0.7472	0.1674	.205
gov	-0.2102	0.3294	0.1860	-0.3759	0.1295	.2674
famo	0.5616	-0.0541	-0.0702	-0.0162	-0.0083	.1863
outsdr	0.1015	0.4849	0.1574	-0.0959	-0.0100	.3961
size_bd	-0.0618	0.5580	-0.1873	0.2145	0.0787	.2924
dual	-0.1502	-0.0073	0.5196	-0.0702	0.1291	.4966
women	-0.1556	0.0146	0.0259	0.0534	0.7132	.2768
famd	0.5353	0.0040	0.0926	-0.0196	-0.0564	.2729

size_ac	0.1051	0.2407	0.2380	0.4716	-0.1055	.4534
ind_ac	0.1376	-0.0258	0.7237	0.1410	-0.0932	.2289

This table presents the oblique rotation of the retained components having an eigen value>1

Table 9. Results

TBQ	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**
crd	-.035295	.0199379	-1.77	**0.077***	-.0743725
compo1	-.1602057	.0731038	-2.19	**0.028****	-.3034865
compo2	.1656948	.0694573	2.39	**0.017****	.0295609
compo3	.390527	.1060128	3.68	**0.000*****	.1827457
compo4	.0962438	.110194	0.87	0.382	-.1197325
compo5	.4091236	.1233539	3.32	**0.001*****	.1673543
crd_compo1	.0049921	.0115941	0.43	0.667	-.0177319
crd_compo2	-.0261003	.0129834	-2.01	**0.044****	-.0515474
crd_compo3	-.014018	.0170095	-0.82	0.410	-.0473559
crd_compo4	.0073196	.0173462	0.42	0.673	-.0266784
crd_compo5	-.0295229	.0195096	-1.51	0.130	-.067761
size_comp	.0514553	.136916	0.38	0.707	-.2168951
lev	-.0031793	.0029123	-1.09	0.275	-.0088873
liquid	.1619466	.0530144	3.05	**0.002****	.0580403
divd	-4.856693	2.40099	-2.02	**0.043****	-9.562546
_cons	1.470658	1.134769	1.30	0.195	-.7534476

This table presents the multivariate statistics of Panel GLS regression random effect after heteroscedasticity and autocorrelation correction. All variables are defined in Table 2. ***, **, and * indicate statistical significance at 1, 5, and 10 % levels of statistical significance for two-tailed tests.

Table 10. Robustness Check

TBQ/ln(TBQ)	**Results**	**Robustness Check (Log transformation for the dependent variable)**
crd	-0.0353	-0.0194
	(0.077)	(0.087)
compo1	**-0.160***	**-0.0986***
	(0.028)	(0.017)
compo2	**0.166***	**0.114****
	(0.017)	(0.004)
compo3	**0.391*****	**0.172****
	(0.000)	(0.004)
compo4	0.0962	0.0545
	(0.382)	(0.383)
compo5	**0.409*****	**0.160****
	(0.001)	(0.022)
crd_compo1	0.00499	-0.000282
	(0.667)	(0.966)
crd_compo 2	**-0.0261****	**-0.0199****
	(0.044)	(0.007)
crd_compo 3	-0.0140	-0.00745
	(0.410)	(0.440)
crd_compo 4	0.00732	0.00554
	(0.673)	(0.573)
crd_compo 5	-0.0295	-0.00342
	(0.130)	(0.757)
size_comp	0.0515	0.0837
	(0.707)	(0.281)
lev	-0.00318	-0.00194
	(0.275)	(0.241)
liquid	**0.162****	**0.0793****
	(0.002)	(0.008)
divd	**-4.857****	**-3.053****
	(0.043)	(0.025)

_cons	1.471	-0.112
	(0.195)	(0.861)
N	156	156

This table compare the findings of this study with a Panel GLS regression random effect after Log transformation. All variables are defined in Table 2. ***, **, and * indicate statistical significance at 1, 5, and 10 % levels of statistical significance for two-tailed tests

Appendix A: Risk disclosure level Index

- Adopted from Linsley and Shrives (2006) and Moumen, Ben Othman and Hussainey (2015), with some modifications according to the Tunisian context.

Operations Risk
Customer Satisfaction
Product Development
Efficiency And Performance
Sourcing
Stock Obsolescence And Shrinkage
Product And Service Failure
Environmental
Health And Safety
Brand Name Erosion
*Out of stock**
*Quality of products**
*Suppliers**
*Employees**
Empowerment Risk

Leadership And Management

Outsourcing

Performance Incentives

Change Readiness

Communications

*Control**

Information Processing And Technology Risk

Integrity

Access

Availability

Infrastructure

Integrity Risk

Management And Employee Fraud

Ilegal Acts

Reputation

*Litigation risk**

Strategic Risk

Environmental Scan

Industry

Business Portfolio

Competitors

Pricing

Valuation

Planning

Life Cycle

Performance Measurement

Regulatory

Sovereign And Political

Financial risk

Interest rate

Exchange rate

Commodity

Liquidity

Credit

*Solvency ratio**

*Profitability ratio**

*Management ratio**

*Working Capital Fun**

*Downside risk**

**: Items added after reading annual reports*